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UNITED STATES DEPARTMENT OF AGRICULTURE  
Rural Electrification Administration  
Technical Standards Committee "A"

Supplement No. 1, October 1990, to  
REA Bulletin 43-5, List of  
Materials Acceptable for Use on  
Systems of REA Electrification Borrowers

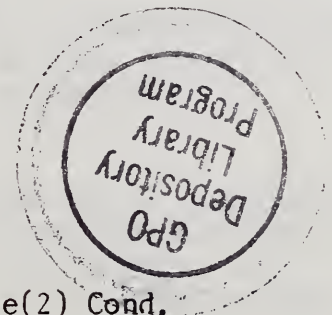
The attached pages for the "List of Materials Acceptable for Use on Systems of REA Electrification Borrowers" are those which have been revised by action of the Technical Standards Committees during the months of July through September 1990. The following changes should be made in order to keep it up to date. Pages with a comma between are on the same sheet, both being changed.

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RECEIVED 1959 17 5

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k - Insulator, distribution deadend

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Chance</u>		
Distribution deadend	965	1. To obtain experience
Catalog No. C654-000	4/22/71	
"Epoxilator II"		2. For use as deadends
(15 kV line-to-line)	1082	on distribution
Catalog No. C654-000	1/22/76	lines only
(25 kV line-to-line)		
	1129	3. Recommended maximum
	12/15/71	working load is 5,000
		lbs.
	B60	4. Not recommended for use
	1/29/90	in areas subject to
		contamination
<u>Joslyn</u>		
Distribution deadend	1074	For use as deadends
UDI 671-3002	9/25/75	distribution lines
	1088	only up to 15 kV
	4/15/76	line-to-line voltage
	1074	
Distribution deadend	9/25/75	For use as deadends
UDI 671-3010	1088	on distribution lines
	4/15/76	only up to 25 kV
		line-to-line voltage
<u>Lapp</u>		
Distribution deadend	1282	Same as Chance
Catalog No. 151001, 15kV	6/21/84	
Catalog No. 151002, 25kV		

NOTE: When insulators from this page are used, adjust construction drawing material list quantities as necessary.

Conditional List  
k (3.1)  
October 1990

k - Insulator, distribution deadend

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Dulmison</u>		
Distribution deadend	1158 (3/1/79)	1. To obtain experience.
H-15 kV-4		2. For use as deadends on distribution lines only.
H-25 kV-6	1208 (3/19/81)	3. Not recommended for use in areas subject to contamination.
	1393 (11/9/89)	
<u>Ohio Brass</u>		
Type PDI-15 (15kV)	1347 (8/13/87)	1. To obtain experience.
"Veri*Lite"		2. For use as deadends on distribution lines only.
Type PDI-25 (25kV)	1410 (8/16/90)	3. Not recommended for use in areas subject to contamination.
"Veri*Lite"		
<u>Salisbury</u>		
Distribution deadend	1226 (1/7/82)	Same as Chance [See Cond. k(3)]
9501 Series, 15 kV		
9502 Series, 25 kV	1304 (8/8/85)	
	1291 (12/20/84)	
<u>Sediver</u>		
Distribution deadend	1286 (9/6/84)	Same as Chance [See Cond. k(3)]
ADI-4 15 kV		
ADI-6 25 kV		
ADI-8 35 kV		

NOTE: When insulators for this page are used, adjust construction drawing material list quantities as necessary.

p - Connectors, Compression

DISTRIBUTION

	<u>Aluminum to aluminum</u>	<u>Aluminum to copper</u>	<u>Copper to copper</u>	<u>Tap Connections (Al to Al, Al to Cu)</u>
Anderson/Sq. D	AC Series	AC Series	VCUC	VCP
Blackburn			Type CF	
Burndy	"Hycrimp" (Type YH)	"Hycrimp" (Type YH)	Crimpfit" (Type YC-C)	"Cabelok Crimpfit" (Type YP-U)
Homac	H Tap-OB&DB	H Tap-OB&DB	cc	H Tap-OB&DB
Kearney	"Squeezeon" (Aluminum)	"Squeezeon" (Aluminum)	"Squeezeon" (Copper)	"Squeezeon" (Aluminum)
Penn-Union	"Press-On" (Aluminum)	"Press-On" (Aluminum)	"Press-On" (Copper)	"Penn-L-Tap"

NOTE: These connectors are acceptable when installed using tools and dies in accordance with the connector manufacturer's recommendations.

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October 1990

p - Connectors, Compression

SERVICE

	<u>Aluminum-to-Aluminum</u> <u>Aluminum-to-Copper</u>	<u>Copper-to-Copper</u>
Anderson/Sq. D	VAUS	VHS
Blackburn	CS, KL	-
Burndy	"Linkits" (Type YSU, YSD)	"Hysplice" (Types YDS-C, YDS-W)
Homac	"Shure Splicers"	-
Kearney	"Serv-ens"	-
National Tel. Supply	"Nicopress"	-
Penn-Union	"Penn Sleeves"	-

These connectors are furnished in a variety of sizes to fit all combinations of aluminum and copper service wire.

NOTE: These connectors are acceptable when installed using tools and dies in accordance with the connector manufacturer's recommendations.

u - Deadend for galvanized steel or  
alumoweld guy strand



3-Bolt Guy Clamp

	Light <u>(1/2" bolts)</u>	Heavy <u>(5/8" bolts)*</u>
Chance	6450	6461
Cooper Power Systems (McGraw-Edison)	DG3C2	DG3C3
Dixie	D6450	D6461
Joslyn	J930	J931
Kortick	K4124	K4005
Util. Service	5273	5275



U-Bolt Guy Clamp

	Light <u>(3/8" bolts)</u>	Heavy <u>(1/2" bolts)</u>
Barron Bethea	GCU-38C	-
Continental	GC-64C	GC-67C
Flagg (MIF)	PAX-64C	PAX-67C

Offset Guy Clamp

	Light <u>(1/2" bolts)</u>	Heavy <u>(5/8" bolts)</u>
Chance	6409	6410
Joslyn	J926	J927

\*For use on transmission.

u - Deadend for galvanized steel guy strand

Strand Size:	1/4"	9/32"	5/16"	3/8"	7/16"
			<u>Automatic</u>		
<u>Fargo</u> Bail for thimble eye	GDE-300	GDE-301	GDE-301	GDE-302	GDE-303
<u>Reliable</u> Bail for thimble eye	5100	5201	5201	5102	5103
Bail for guy insulator	5150	5251	5251	5152	5153
<u>Formed Type</u>					
<u>Alcoa</u> For standard guy*	SGG-610	SGG-710	SGG-0790	SGG-0915	SGG-11-5
<u>Carolina Formed Wire</u> For standard guy*	50-0250		50-0312	50-0375	
<u>Chance</u> For standard guy*	1/4 CTLG	9/32 CTLG	5/16 CTLG	3/8 CTLG	7/16 CTLG
For wrapped guy	1/4 GSC-C	9/32 CTLG-C	5/16 GSC-C	3/8 GSC-C	7/16 GSC-C
<u>Dulmison</u> For standard guy*	SGG-0610	SGG-710	SGG-0790	SGG-0915	SGG-1105
<u>Florida Wire &amp; Cable</u> For standard guy*	FLA 1300	FLA 1400	FLA 1500	FLA 1600	FLA 1700
<u>Helical Line Products</u> For standard guy*	HG-207-1/4"	HG-208-9/32"	HG-209-5/16"	HG-210-3/8"	HG-211-7/16"
<u>Preformed Line Products</u> For standard guy*	GDE-1104	GDE-1105	GDE-1106	GDE-1107	GDE-1108
For wrapped guy	WGL-2100	WGL-2101	WGL-2102	WGL-2103	WGL-2104

\*Class B galvanizing. When guy wire has Class C galvanizing, formed deadend should also have Class C galvanizing.

w  
October 1990

w - Insulators, guy strain  
(Fiber Reinforced Plastic)

Ult. Strength, pounds	11,000	15,000	21,000
<u>Barron Bethea</u>	BB-11-CC Series	BB-15-CC Series	BB-21-CC Series
<u>Continental</u>	G-11 Series	G-15 Series	G-21 Series
<u>Dulmison</u>	HSI1-1P Series	HSI-2X Series	HSI3-1P Series
<u>Flagg (MIF)</u>	150 Series	150 Series	210 Series
<u>Hughes Brothers</u>		992 Series	994 Series
<u>Reliable/Bethea</u>	FGS16 Series	FGS16 Series	FGS21 Series

X  
July 1990

x - Rod, anchor

Applicable Specification: ANSI C135.2, "Standards for  
Galvanized Ferrous Strand  
Eye Anchor Rods."

Applicable Sizes: Single guy - 5/8 inch diam. 6, 7 and 8 feet long  
- 3/4 inch diam. 8, 9 and 10 feet long  
- 1 inch diam. 9 and 10 feet long

Double guy - 5/8 inch diam. 7 and 8 feet long  
- 3/4 inch diam. 8, 9 and 10 feet long  
- 1 inch diam. 9 and 10 feet long

Single Guy Drive - 5/8 inch diam. 7 and 8 feet long  
- 3/4 inch diam. 8, 9 and 10 feet long  
- 1 inch diam. 9 and 10 feet long

Double Guy Drive - 5/8 inch diam. 7 and 8 feet long  
- 3/4 inch diam. 8, 9 and 10 feet long  
- 1 inch diam. 9 and 10 feet long

The following manufacturers have shown compliance with the applicable specifications. Some manufacturers cannot supply all sizes listed above. Check with manufacturer or distributor for availability.

Carolina Galvanizing  
Chance  
Cooper Power Systems  
Dixie  
Grip-Tite

Joslyn  
Knight  
Kortick  
Utilities Service



z - Anchors, Power-installed screw

Manufacturer:

A. B. Chance Company  
"SS" Multi Helix Anchors

Working Load Categories

Soil Type	35,600 N (8,000 lb.)	53,400 N (12,000 lb.)	71,000 N (16,000 lb.)	89,000 N (20,000 lb.)
A1	12642-AE	12642-AE	12642-AEJ	12642-AEJ
Soil	12642-AEJ	12642-AEJ	12642-EJN	12642-EJN
Class 2	12642-EJN	12642-EJN	12642-EJNS	12642-EJNS
A2	12642-AE	12642-AE	12642-AEJ	12642-EJN
Soil	12642-AEJ	12642-AEJ	12642-EJN	12642-EJNS
Class 3	12642-EJN	12642-EJN	12642-EJNS	
B	12642-AE	12642-AEJ	12642-AEJ	12642-EJNS
Soil	12642-AEJ	12642-EJN	12642-EJN	
Classes 4 & 5	12642-EJN		12642-EJNS	
C	12642-AEJ	12642-EJN	12642-EJNS	
Soil	12642-EJN			
Classes 6 & 7				

Manufacturer:

Joslyn

"PS" Screw Anchors

Working Load Categories

Soil Type	35,600 N (8,000 lb.)	53,400 N (12,000 lb.)	71,000 N (16,000 lb.)	89,000 N (20,000 lb.)
A1	J23380ACA	J23380ACA		
Soil	J23381ACA	J23381ACA		
Class 2	J23383ACA	J23383ACA		
A2	J23380ACA	J23380ACA	J23381ACA	J23383ACA
Soil	J23381ACA	J23381ACA	J23383ACA	J29726ACA
Class 3	J23383ACA	J23383ACA	J29726ACA	
B	J23380ACA	J23380ACA	J23381ACA	J29726ACA
Soil	J23381ACA	J23383ACA	J23383ACA	
Classes 4 & 5	J23383ACA		J29726ACA	
C	J23381ACA	J23383ACA	J29726ACA	
Soil	J23383ACA			
Classes 6 & 7				

NOTES: 1. See REA Specification T-10 for definitions and explanations.

2. Anchors in the 53,400 N (12,000 lb.) category or above for use on wood poles must be used with hardware commensurate with the working load. Hardware may provide for either single or multiple guy attachments to the anchor.

3. Anchors listed in a specific working load category and/or soil class may generally be used at lower working load categories and/or lower numerical soil classes.

z - Anchors, Power-installed screw

Manufacturer: Dixie Electrical Manufacturing Company  
Multi-Helix Screw Anchors

Working Load Categories				
Soil Type	35,600 N (8,000 lb.)	53,400 N (12,000 lb.)	71,000 N (16,000 lb.)	89,000 N (20,000 lb.)
A1	D-6632	D-6632	D-6636	D-6636
Soil Class 2	D-6636	D-6636	D-6637	D-6637
A2	D-6637	D-6637	D-6638	D-6638
Soil Class 3	D-6632	D-6632	D-6636	D-6637
B	D-6636	D-6636	D-6637	D-6638
Soil Classes 4 & 5	D-6637	D-6637	D-6638	
C	D-6632	D-6636	D-6636	D-6638
Soil Classes 6 & 7	D-6636	D-6637	D-6637	
	D-6637		D-6638	

- NOTES: 1. See REA Specification T-10 for definitions and explanations.
2. Anchors in the 53,400 N (12,000 lb.) category or above for use on wood poles must be used with hardware commensurate with the working load. Hardware may provide for either single or multiple guy attachments to the anchor.
3. Anchors listed in a specific working load category and/or soil class may generally be used at lower working load categories and/or lower numerical soil classes.

af - Power Fuses, Substation

<u>Manufacturer</u>		<u>Type</u>	<u>Voltage Rating</u>
ABB	RDB	(Boric acid, refillable)	15-34.5
	DBS	(Boric acid, non-refillable)	15-34.5
	DBA	(Boric acid, refillable)	46-69
Kearney	HX		15
	HX		27
S & C Electric*	XS		15-25
	SMD (Boric Acid)		15-138
Southern States	Series P		15-161

\*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators 34.5 kV on request.

NOTE: All fuses listed on this page should be furnished with NEMA standard insulators. The buyer should specify the current rating, voltage rating, interrupting rating and required accessories.

Conditional List  
 af  
 July 1990

af - Cutouts, Distribution, Open  
 with Linkbreak Attachment

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Rating</u>	<u>Meeting No. and date</u>	<u>Conditions</u>
A.B. Chance	C	15, 27 kV	1311 (12/19/85)	1. To obtain experience. 2. Limited to 100 amp cutouts. 3. To be used only with Chance, Cooper (McGraw-Edison) and Kearney fuses. Will not break S&C and some other fuse types.

ai - Rods, Ground

Applicable Size: The standard length is 8 feet and catalog numbers listed below are for this length. Longer rods may be required for special conditions.

Copper-covered ground rods are listed with a 13 mil minimum at any point and a 15 mil average covering of copper. All purchases should specify that a factory certification of the thickness of the copper must accompany the shipment of the rods.

Copper-covered steel rods

	<u>5/8"</u>
Apache	588R
Blackburn	625813MX
Boggs	EB-810-13
Carolina Galvanizing	615883
Galvan	6258G13
Joslyn	J8338-13
Knight	858-13
Korns	KCG588-13
Wilcor	WA588C

Stainless Clad Steel

<u>Manufacturer</u>	<u>5/8"</u>	<u>3/4"</u>
Teledyne (MEFCO)	"PERMAGROUND"	"PERMAGROUND"

ai - Rods, Ground

Applicable Size: The standard length is 8 feet and catalog numbers listed below are for this length. Longer rods may be required for special conditions.

Hot Dip Galvanized Steel

<u>Manufacturer</u>	<u>5/8"</u>	<u>3/4"</u>
Blackburn	GR6258	GR7508
Boggs	G588	G348
	PTG588**	PTG348**
Carolina Galvanizing	815880	813480
	815889**	813489**
Chance	8578	8618
	C203-0107**	C203-0109**
	C203-0377*	
Cooper Power Systems (McGraw-Edison)	DN5S8	DN6S8
	DN6D8*	
Dixie	D8578	D8618
Erico	G588	G348
	G588PT**	G348PT**
Galvan	GR6258	GR7508
General Electric	0982-00002	0982-00003
Grip-Tite	GT588	GT348
	GT588PT**	GT348PT**
Joslyn	J3358B*	J3458B*
	J5328	J5338
	J5228**	J5238**
Knight	G-588	G-348
	G-588PT**	G348PT**
Korns	KG58	KG34
Kortick	K4658	K4678
Lloyd	6258H	7508H
Porcelain Products	7338	7348
Power Line Hardware	GR-588G	GR-348G
Utilities Service	5307	6338
Wilcor	WA8580G	WA8340G

Electro-Galvanized Steel

Apache	G588**	G348*
	G588PT**	G348PT**
Calpico	G8580	-
LMP	6258E**	7508E**

Stainless Steel

Teledyne (MEFCO)	TDY Sol	TDY Sol
Wilcor	WA 588-S	WA348-S

\*Rod furnished with clamp.

\*\*Rod furnished with 4 ft., No. 6 tinned or galvanized copper pigtail.

Conditional List  
aj  
July 1990

aj - Clamp, ground rod

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Burndy</u> YGHP (for 5/8" copper- covered rods)	1234 5/13/82	To obtain experience.
<u>Power Line Hardware</u> RC-34 (for 5/8" and 3/4") galvanized or stainless steel ground rods	1114 5/12/77	To obtain experience.

al  
October 1990

al - Staples, ground wire

Applicable Specification: ANSI C135.14, "Standards for  
Staples with Rolled or Slash  
Points."

Length x Spread (inches)	1-1/2 x 1/4	2 x 1/2	1-1/2 x 3/8	3 x 1-1/16
Diameter	9 gauge <u>Galv. Steel</u>	8 gauge <u>Galv. Steel</u>	8 gauge <u>Copper-Coated</u>	1/4 <u>Moulding</u>
Apollo	AP521-S1672G	AP521-S1570	AP501-S6652	AP500-S6497
Blackburn	-	-	CUS9	CUS22
Chance	C205-0247	C205-0216	9167	9161
Copperweld Southern		-	CP52	-
FWC	FW1672G	FW157	FW6652	FW6497
Joslyn	J1672G	J157	J6652	J6497
Kortick	-	-	K247	K236
Larson	-	350453	750233	721312
Lindsey	10248	-	-	10270
Utilities Service 88		86	48	46

Barbed staples, ground wire

Length x Spread (inches)	1-1/2 x 3/8	2 x 5/8	1-1/2 x 3/8	3 x 1-1/16
Diameter	.131 <u>Galv. Steel</u>	.165 <u>Galv. Steel</u>	.140 <u>Copper-Coated</u>	7/32 <u>Galv. Steel</u>
Apollo		AP520-57488HTG	AP501-S66525	
Joslyn	J7656	J7672	J7682	J7664

Staples, alumoweld

Length x Spread (inches)	2 x 1/2	1-1/2 x 3/8	3 x 1-1/16
Diameter	8 gauge <u>8 gauge</u>	8 gauge <u>8 gauge</u>	1/4 moulding <u>1/4 moulding</u>
Apollo	AP531-S6655AL	AP531-S6652AL	AP530-S7493AL
Joslyn	-	J6652AL	J-7493AL

Clip. ground wire

Kearney

12326

an - Transformers, distribution, pole type  
Primary Voltages 7.2/12.5, 7.62/13.2 and 14.4/24.9 kV

	<u>7.2/12.5 &amp; 7.62/13.2</u>	<u>14.4/24.9</u>	<u>Dual Voltage</u>
<u>ABB</u>			
Conventional, single bushing	S-B3	S-B3	S-B3
Self-protected, single bushing	CSP-B3	CSP-B3	CSP-B3
Conventional, two bushing	S-A	S-A	S-A

Type S-B3 may also be obtained with internal fuse, with internal fuse and double gap, and with lightning arrester and open link cutout (Type PC).

<u>United (Ky. AEC)</u>			
Conventional, single bushing	SC	SC	DSC
Conventional, two bushing	SC	SC	DSC
Self-protected, single bushing	SCP	SCP	DSCP

SC and DSC may be purchased with external fuse and arrester (SP and DSP)

<u>VanTran</u>	
Conventional, single bushing	CR
Self-protected, single bushing	CSP-R
Conventional, two bushing	CD

Transformers with 115 kV and 138 kV primary voltage ratings are acceptable with full BIL and with one step reduced BIL.

"X" indicates that acceptable test data have been furnished REA for this operating and for secondary voltages in either 15 kV or 25 kV class.

All acceptances are based on standard impedances, taps, winding designs, materials and accessories. Variations should not be ordered except under special circumstances. Complete design tests should be specified for special designs.

[illegible]

an - Transformers, Step Ratio, Single Phase,  
Autotransformers or Two-Winding Transformers  
for Use in System Voltage Conversion

Condition of Acceptance: To obtain experience.

<u>Manufacturer</u>	<u>Designation</u>	<u>Size</u>
<u>ABB</u> 2-WND	"Jumbo"	167-500
<u>Central Moloney</u> 2-WND	AOD	167-500
<u>Cooper Power Systems</u> 2-WND AUTO	"Round-Coil" MEPS-AUTO	167-500 167-1000
<u>Delta Star</u> 2-WND AUTO	LTD LTD-A	167-500 167-1000
<u>General Electric</u> 2-WND AUTO	HS STEP HS STEP	167-500 167-1000
<u>Howard Industries</u> 2-WND	STEPS	167-500

NOTE: Two-winding transformers are self-protected under external short circuit in accordance with ANSI C57.12.90A. Auto-transformers will withstand 25 times rated current under external short circuit in accordance with ANSI C57.12.90A.

ao  
July 1990

ao - Bolt, strand eye, straight (thimble eye)

Applicable Specification: ANSI C135.4, "Standards for  
Galvanized Ferrous Eye Bolts  
and Nuts for Overhead Line  
Construction."

Applicable Sizes : 5/8 inch, 6 through 12 inch length  
3/4 inch, 8 through 12 inch length

The following manufacturers have shown compliance with the applicable  
specification:

A. B. Chance Company  
\*Cooper Power Systems (McGraw-Edison)  
Dixie Electrical Manufacturing Company  
Joslyn Mfg. and Supply Company  
Kortick Manufacturing Company  
Utilities Service Company



\*"Static proof" designs available.

bb  
July 1990

bb - Brace, sidearm vertical

	<u>26" brace 24" bolt-hole spacing</u>	<u>50" brace 24" bolt-hole spacing</u>
Cooper Power Systems (McGraw-Edison)	DB1V1	DB1V3
Dixie	D6986	D6987
Joslyn	J1536	J1537
Kortick	K1931	K1932
Utilities Service	5249	5250

be-1  
October 1990

be - Reclosers, oil vacuum

<u>Mfr</u>	<u>Phases</u>	<u>Type</u>	<u>Circuit Voltage</u>	<u>Continuous Rating</u>	<u>Int. Rating</u>	<u>Oil/ Vacuum</u>	<u>Hydraulic/ Electronic</u>
Cooper (McGraw- Edison)	1	H	12.5/7.2	5-50	1250	0	H
	1	4H	12.5/7.2	5-100	2000	0	H
	1	L	12.5/7.2	25-100	4000	0	H
	3	6H	12.5/7.2	5-100	2000	0	H
	3	W	12.5/7.2	100-560	10,000	0	H
	3	WE	12.5/7.2	560	10,000	0	H
	3	VSA-12	12.5/7.2	100-560	12,000	V	E
	1	E	24.9/14.4	5-100	2500	0	H
(Type E available with shunt lockout solenoid for three-phase operation)							
	1	4E	24.9/14.4	50-200	4000	0	H
	3	WV	34.5/19.9	560	8000	0	H
	3	WVE	34.5/19.9	560	8000	0	E
Lexington Switch and Controls	1	A Line Model B	12.5/7.2	5-50	1250	0	H
	1	A Line Model D	12.5/7.2	25-100	2000	0	H
	1	A Line Model K	12.5/7.2	25-100	4000	0	H

NOTES:

1. Reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 application, and 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device.
2. Reclosers are not acceptable with load current, bushing CT battery chargers.

be - Recloser, oil circuit  
12.5/7.2 kV

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>ABB</u>		
Three Phase oil circuit	1070 (7/24/75)	To obtain experience.
Recloser (Shunt trip with	1077 (11/13/75)	
static or relay type	1394 (11/20/89)	
controls)		
Type ES-400 (15-400 amperes)		
Type ES-560 (15-560 amperes)		
Type ESM-560 (100-560 amperes)		
Type ES-105 (15-560 amperes)		
<u>Cooper Power Systems (McGraw-Edison)</u>		
Single phase, Type D rated	1410 (8/16/90)	To obtain experience.
100 amperes continuous		
10,000 amperes symmetrical		
<u>Lexington Switch and Controls</u>		
Three phase oil circuit	808 (1/7/65)	To obtain experience.
recloser, 50,100 and 280		
ampere frames.		
A Line, Model 3B (5-50 amperes)	1087 (4/1/76)	
Model 3D (5-100 amperes)		
Model 3K (25-280 amperes)		

24.9/14.4 kV

<u>Lexington Switch and Controls</u>		
Oil circuit recloser,	620 (4/18/57)	To obtain experience.
Single phase-A Line, Model M	1080 (12/23/75)	
rated 100 amperes		
Three phase-A Line, Model 3M	1329 (10/9/86)	
rated 100 amperes		

34.5/19.9 kV

<u>Cooper Power Systems (McGraw-Edison)</u>		
Single phase, Type DV rated	1410 8/16/90)	To obtain experience.
100-280 amperes continuous,		
8,000 amperes symmetrical		

NOTES:

1. Reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and greater than 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device.

2. Reclosers are not acceptable with load current, bushing CT battery chargers.

Conditional List  
be(2)  
October 1990

be - Reclosers, vacuum interrupter

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>ABB</u>		
Three phase Type ESVA rated 560/800 amps continuous, 12,000 amps symmetrical, maximum voltage 15.5 kV for 12.5/7.2 kV	1259 (5/19/83)	To obtain experience.
Three phase Type ESMVA rated 560 amps continuous, 16,000 amps symmetrical, maximum voltage 15.5 kV for 12.5/7.2 kV	1259 (5/19/83)	To obtain experience.
Three phase Type ESV rated 800 amps continuous, maximum voltage 38 kV 24.9/14.4 kV	1117 (6/23/77) 1239 (7/29/82)	To obtain experience.
<u>Cooper Power Systems (McGraw-Edison)</u>		
Single phase, Type V4H rated 5-100 amperes continuous, 2,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	921 (6/26/69)	To obtain experience.
Single phase, Type V4L rated 50-100 amperes continuous, 6,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	1410 (8/16/90)	To obtain experience.
Three phase, Type V6H rated 5-100 amperes continuous, 2,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	921 (6/26/69)	To obtain experience.

NOTES:

1. Reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and greater than 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device.
2. Reclosers are not acceptable with load current, bushing CT battery chargers.

be - Reclosers, vacuum interrupter

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Cooper Power Systems (McGraw-Edison)		
Three phase, Type VW rated 560 amperes continuous , 2,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	1005 (12/7/72)	To obtain experience.
Three phase, Type VWE rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	1005 (12/7/72)	To obtain experience.
Three phase, Type VSA-16 rated 560 amperes continuous, 16,000 amperes symmetrical, maximum voltage 15.5 kV for 12.5/7.2 and 13.2/7.62 kV	1410 (8/16/90)	To obtain experience.
Three phase, Type VWV27 rated 560 amperes continuous 12,000 amperes symmetrical, maximum voltage 27 kV for 24.9/14.4 kV	1021 (7/19/73)	To obtain experience.
Three phase, Type VWVE27 rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 27 kV for 24.9/14.4 kV	1014 (4/12/73)	To obtain experience.
Three phase, Type VWV38 rated 50-560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 38 kV for 34.5/19.9 kV	1410 (8/16/90)	To obtain experience.

NOTES:

1. Reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and greater than 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device.
2. Reclosers are not acceptable with load current, bushing CT battery chargers.

Conditional List

be(2.2)

October 1990

be - Recloser, vacuum interrupter

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Cooper Power Systems (McGraw-Edison) Three phase, Type VWVE38 rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 38 kV for 34.5/19.9 kV	1410 (8/16/90)	To obtain experience.
Three phase, Type VSO-12 rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 38 kV for 34.5/19.9 kV	1410 (8/16/90)	To obtain experience.
Three phase, Type VSO-16 rated 560 amperes continuous, 12,000 amperes symmetrical, maximum voltage 38 kV for 34.5/19.9 kV	1410 (8/16/90)	To obtain experience.

NOTES:

1. Reclosers with ratings greater than 100 amp for 12.5/7.2 kV application, greater than 200 amp for 24.9/14.4 kV application, and greater than 280 amp for 34.5/19.9 kV application are acceptable only with ground trip device.
2. Reclosers are not acceptable with load current. bushing CT battery chargers.

bx - Splice, automatic

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
DISTRIBUTION		
<u>Blackburn</u> #4, #2 ASCR ATS42 #1/0, #2/0 ASCR ATS1020 #3/0, #4/0 ASCR ATS3040 266.8, 335.4, kcmil ASCR ATS266336 477 kcmil ASCR ATS397477	1406 (6/14/90)	1. To obtain experience 2. For use on distribution systems only.
<u>Fargo</u> AWAC 4 - 4/3 GLA-105 AWAC 2 - 4/3 GLA-110 AWAC 1/0 - 4/3 GLA-115 266.8 kcmil ACSR 18/1 GL-1315A 336.4 kcmil ACSR 18/1 GL-1315A 477 kcmil ACSR 18/1 GL-1325A	1087 (4/1/76)      B55 (2/12/86)	Same as above.      Same as above.
<u>Reliable</u> 266.8 kcmil ACSR 18/1 7657 336.4 kcmil ACSR 18/1 7658 477 kcmil ACSR 18/1 7659	1412 (9/20/90)	Same as above.

DISTRIBUTION AND TRANSMISSION

<u>Fargo</u> 266.8 kcmil ACSR 26/7 336.4 kcmil ACSR 26/7 477 kcmil ACSR 26/7	1384 (5/18/89)	To obtain experience
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by  
July 1990

by - Deadend, Automatic and Formed Type

Conductor Size

<u>Cu</u>	<u>CWC</u>	<u>Fargo</u>	<u>Reliable</u>
-	4A	GD-515	27-SDS
-	6A	GD-513	47-SDS
-	8A	GD-512	-
2 x 3	-	GD-515	271
4	-	GD-512	41LD
6	-	GD-511	61LD

ACSR

*Fargo	GD-400 Series
*Preformed	OG-9360 thru 9366 #OHDE-9534 thru 9540, 4577
*Reliable	7650 Series

#May only be used with a spool insulator (Item cm) and appropriate clevis for neutral and secondary applications.

Aluminum Alloy  
(6201 and 5005)

Fargo	GD-A Series
Preformed	OG-9360 thru 9366
Reliable	AL Series

\*For use on distribution conductors 4/0 and smaller only.

Conditional List  
by  
October 1990

by - Deadends, automatic and formed type

<u>FORMED TYPE</u>		
<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Preformed Line Products</u>		
AWAC 4 - 4/3 DG-4560	993 (6/8/72)	To obtain experience.
AWAC 2 - 4/3 DG-4562		
AWAC 1/0 - 4/3 DG-4565		
<u>AUTOMATIC TYPE</u>		
<u>Fargo</u>		
AWAC 4 - 4/3 GDA-235	1087 (4/1/76)	To obtain experience.
AWAC 2 - 4/3 GDA-240		
AWAC 1/0 - 4/3 GDA-245		
266.8 kcmil ACSR 18/1 GD-5315A	B55 (2/12/86)	1. To obtain experience
336.4 kcmil ACSR 18/1 GD-5315A		2. For use on distribu- tion lines only.
477 kcmil ACSR 18/1 GD-5325A		
<u>Reliable</u>		
AWAC 4 - 4/3 5201	1026 (9/27/73)	To obtain experience.
AWAC 2 - 4/3 5202	1035 (2/21/74)	
AWAC 1/0 - 4/3 5204		
266.8 kcmil ACSR 18/1 7657 SDS	1412 (9/20/90)	1. To obtain experience.
336.4 kcmil ACSR 18/1 7658 SDS		2. For use on distribution lines only.
477 kcmil ACSR 18/1 7659 SDS		

bz  
July 1990

bz - Switch, oil

12.5/7.2 kV

	<u>Type</u>	<u>Description</u>
ABB	CSL**	Single-phase, manual and remote manual or elec. control, 200 amp. Three-phase, remote manual or elec. control, 200 amp.
Cooper Power Systems (McGraw-Edison)	NR*	Single-phase, remote elec. control, 200 amp.
	VR*	Three-phase, remote elec. control, 400 amp.
General Electric	FKC-2	Single and three-phase, manual, 200 amp.
	FKC-2*	Single and three-phase, remote control, 200 amp.

\*Control equipment should be selected in accordance with the requirements of individual installations.

\*\*This item is also available in a special design for use in areas where corrosion is a serious problem.

cg - Switch, air, three-pole, group-operated NEMA standard switches for station and line structures									
Manufacturer	Acceptable Mounting on Structures	Tilting Ins. Type	Vertical Break Type	Side Break Type	Center Break Type	Double Break Type			
S & C***	Horizontal Phase over Phase Vertical		Alduti(L)15-34.5 Alduti(L)15-25 Alduti(L)*15-34.5	Alduti(L)15-25 Alduti(L)15-25 Alduti(L)15-25		Alduti(L)34.5-46 Alduti(L)34.5-46 Alduti(L)*34.5-46			
SEECO	Phase over Phase		GOABS(VL) 15-69						
Siemens-Allis	Horizontal		TA(VL) 15-69 AVB(VL)**115-345	SSB-T 15-69	CCB115-230 CBL-2 115-230				
Southern States	Horizontal		EV 15-230	57K 15-69	EC 115-230				
Turner	Phase over Phase Horizontal Horizontal		TH1(VL) 15-161	(1D, 2D, 3D)(VL) 15-161 1D(VL) 15-161					
USCO	Horizontal Horizontal Phase over Phase		AGT(VL)**15-230	GSH-4(VL)15-138 GSH-4(VL)15-138	AGCH **15-345 AGCH-V**34.5-230 GCH 15-23				

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

\*These switches, except 34.5 kV Alduti vertical break, are available and accepted with the S & C type SMD substation fuse cutouts listed on page af-3.

\*\* Also available in bronze in some ratings.

\*\*\*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

NOTE: Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

cg-3  
October 1990

cg - Switch, air, three pole, group operated

(FOR USE ON STEEL SUBSTATION STRUCTURES)

<u>Manufacturer</u>	<u>Mounting</u>	<u>Vertical</u>		<u>Side Break</u>	
		<u>Type</u>	<u>kV</u>	<u>Type</u>	<u>kV</u>
Chance	Vertical			D7(L)	15-27
	Horizontal			D7(L)	15-27
S & C*	Phase-over-Phase	Alduti(L)	34.5	Alduti(L)	34.5
		(200 kV BIL)		(200 kV BIL)	
	Vertical	Alduti (L)	34.5		
		(200 kV BIL)			

(L) Means gas or solid material full-load interrupters are accepted and available.

\*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

cg - Switch, air, three-pole, group operated  
(not Suitable for Substation Use)

Manufacturer	Acceptable Mounting	Vertical Break		Side Break		Center Break	
		Type	kV	Type	kV	Type	kV
Chance	Horizontal			D6(L)	15-34.5		
	Phase over Phase			D6(L)	15-34.5		
	Vertical			D7(L)	15-34.5		
Kearney/KPF	Horizontal			A202-A208	15-110		
	Phase over Phase			A202(L)	15-21		
	Phase over Phase			W202(L)	15-21		
	Phase over Phase			MD202(L)	15-21		
Royal Switchgear	Horizontal					V	15-23
	Phase over Phase					V	15-23

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

NOTE: Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

cg - Switch, three-pole, group-operated  
(Factory Preassembled)

<u>Manufacturer</u>	<u>Acceptable Mounting on Structures</u>	<u>Vertical Break Type      kV</u>	<u>Side Break Type      kV</u>
ABB	Horizontal (A)		SLB-3(L)15-25
Chance	Horizontal (A)		D7(L)15-27
	Phase over phase (A)		D7(L)15-27
	Vertical (A)		D7(L)15-27
	Horizontal (B)		D7(L)34.5
	Phase over phase (B)		D7(L)34.5
	Vertical (B)		D7(L)34.5
Kearney/KPF	Horizontal (A)		GB202-H(L) 15-25
	Phase over phase (A)		GB202-V(L) 15-25
S&C*	Horizontal (A)		Alduti(L)15-25 Alduti(L)34.5 (200 kV BIL)
	Phase over phase (A)		Alduti(L)25 Alduti(L)34.5 (200 kV BIL)
	Vertical (A)		Alduti(L)15-25 Alduti(L)34.5 (200 kV BIL)
	Phase over phase (B)	Alduti(L)34.5	Alduti(L)34.5
	Vertical (B)	Alduti(L)34.5	

(L) Means gas or solid material full-load interrupters are accepted and available.

(A) Not suitable for substation use.

(B) For station and transmission use only. The steel crossarm base must be grounded with an adequate grounding connector. 200 kV BIL only.

NOTE: Switches with factory-assembled crossarm type bases for distribution lines must have non-conducting crossarm type bases, non-conducting braces, and insulated interphase and control rods, except as otherwise noted.

\*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

cg - Switch, Air, Three-Pole, Group Operated

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>PASCOR</u>		
VBP (15 - 230 kV)	1405	1. To obtain experience
VBS (69 - 230 kV)	5/31/90	
Vertical break, vertical or horizontal mounting. Phase-over-Phase mounting (VBS, 69 - 115 kV only)		2. Insulated interphase and control rods on wood distribution structures.
<u>SEECO</u>		
GOABS (VL)	1201 (12/4/80)	To obtain experience.
Vacuum interrupter type 115-169 kV		
<u>S &amp; C*</u>		
Line-rupter with SF <sub>6</sub> inter- rupter. Horizontal mounted 69-230 kV	1202 (12/18/80)	To obtain experience.
Vertical mounted 69-161 kV		
Omni-Rupter (L)	1355 (1/14/88)	To obtain experience.
Side-break, horizontal phase-over-phase, and vertical mounting, with non-conducting crossarm type base and insulated interphase and control rods, 15 kV and 25kV	1371 (10/6/88)	" " "

(L) Means full-load interrupter accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

\*Available with porcelain insulators. Available with Cypoxy insulators through 34.5 kV on request.

cj  
July 1990

cj - Pole Ground Wire

Soft annealed iron, BB Grade, class C galvanizing  
(For pole protection only)

Size  
1.15 Ohms/1000 ft., max.

Manufacturer

Bethlehem Steel	3-wire, 5/16 inch
Indiana Steel and Wire	3-wire, 5/16 inch
Southwire	3-wire, 5/16 inch
U. S. Steel	3-wire, 5/16 inch
National Strand Products	3-wire, 5/16 inch

Copper, soft annealed solid  
ASTM Specification B3

Manufacturer  
(See page av-2)

Aluminum (for above ground use only)  
Three-quarter hard-drawn EC grade

Manufacturer  
(See page av-1)

Aluminum Alloy (for above ground use only)

<u>Manufacturer</u>	<u>Type</u>
ALCAN	6201
ALCOA	6201
American Electrical	6201
Kaiser	6201
Reynolds	5005
Southwire	6201, 5005

Copper-Clad Steel, Annealed 40 percent Conductivity

<u>Manufacturer</u>	<u>Size</u>
Copperweld Southern*	No. 6

\* Not for use on distribution when neutral is larger than #1/0 ACSR.

dt  
October 1990

dt - Deadend, service

For deadending triplex type service cable, Drawing K10C.

<u>Manufacturer</u>	<u>ACSR Size</u>	<u>Catalog Number</u>	<u>Formed Type</u>
		<u>Wedge Type</u>	
Chance	4	-	CSG-030
	2	-	CSG-050
	1/0	-	CSG-070
Helical Line Products	4	-	HSG-514
	2	-	HSG-518
	1/0	-	HSG-522
Joslyn	4 & 2	R7295	-
	1/0	R7287	-
Penn-Union	4	WDC-2S	-
		-	-
Preformed Line Products	4	-	SG-4502
	2	-	SG-4504
	1/0	-	SG-4506
Reliable	4	7195	-
	2	7187	-
	1/0	7287	-

du  
July 1990

du - Link, Extension

DISTRIBUTION

Manufacturer

Catalog Number

Chance  
Continental  
Cooper (McGraw-Edison)  
Flagg (MIF)  
Reliable/Bethea  
Utilities Service

C207-0112  
CEL-14  
DC33B6  
PA319  
LCE-14  
495

TRANSMISSION

(25,000 lbs. min. strength)

Joslyn  
Reliable/Bethea Products

J26082  
ASM 7209-1-BC

Guy Extension Link  
(For "H" Structure)

Manufacturer

One Guy Attachment

Two Guy Attachment

Joslyn

J22421

J26025

NOTE: The distribution extension links may be substituted for anchor shackle (Item bo), eye bolt (Item o) and eye nut (Item aa) for both small and large conductor drawings shown in REA Form 803 and REA Bulletin 50-3 at the option of the owner.

er  
July 1990

er - Wire Guard, Plastic

See Drawing M-24

Manufacturer

Type or  
Catalog Number

Chance

PFG

Fargo

GM-936

Preformed Line Products (Tree Guard)

PTG

es  
October 1990

### es - Splice Cover, Plastic

(For use over compression type service connections  
in place of tape.)

<u>Manufacturer</u>	<u>Type</u>
Anderson/Square D	Type SEC
Kearney	Type 601
Plastic Engineering & Sales Co.	Wire Splice Cover
3M	PST Series 8420
Virginia Plastics	Type VP

### Splice Cover and Moisture Seal for Secondary Cable Connections (See Drawings G312 and UM5)

<u>Manufacturer</u>	<u>Type</u>
AMP	Sealing & Dielectric Compound
Plymouth/Bishop	10 Plyseal
3M	Scotch Brand #2200

### Bolted Connector Cover

(For use over bolted type service connections in place of tape.)

<u>Manufacturer</u>	<u>Type</u>
Fargo	GA-9000 B Series

fd  
October 1990

fd - Hangers, Capacitor

Crossarm Mounting

	<u>1 unit</u>	<u>2 units</u>	<u>3 or 4 units</u>
ABB	85B397G01	791C644G01	791C644G02
Cooper Power Systems (McGraw-Edison)	CH1A1	CH2A2	CH4A1
General Electric	39F41G2	39F53	39F80G1

Pole Mounting

	<u>Single Phase</u>	<u>Three Phase</u>	
		<u>In Line</u>	<u>Cluster</u>
ABB	AL30R (3 units)	(1 units)	
	AL60R (6 units)	AL30R	(3 units)
		AL60R	(6 units)
		AL90R	(9 units)
		(3 units)	
		AL13W	(1 unit)
		AL23W	(2 units)
		AL33W	(3 units)
		AL43W	(4 units)
		AL53W	(5 units)
Aluma-Form	CR-3* thru CR-6*	CR-3/4*	3-CR-3/4*
General Electric	39F41G1 (1 unit)	39F86G1	
	39F83G1 (3 units)		
Joslyn	J6744, J6744A		

\* Available with oil switch mounting bracket.

fg  
July 1990

fg - Crossarm Saddle

(3-3/4" x 4" with 1-1/4" x 1/4" flange)

Manufacturer

Catalog Number

Lapp

10369

ga - Watthour and watthour-Demand Meters

Polyphase - 3 element - 4 wire wye - (120/208) (277/480) volt  
(Classes 100, 200, 10, and 20)

<u>Self-Contained Types</u>					
1	2	3	4	5	6
Manufacturer	Type of Base	Watthour Meter Type	Mechanical Demand Watthour Type	Thermal Demand Watthour Type	Number of Terminals
ABB	Bottom Con. Socket	D5-A3	D5A3M	-	-
		D5-S3	D5S3M	-	7 or 8
General Electric	Bottom Con. Socket	V64A	VM64A	-	-
		V64S	VM64S	-	7 or 8
Landis & Gyr	Bottom Con. Socket	-	-	-	-
		MT-16S	BMT-16S	-	7
Schlumberger	Bottom Con. Socket	S4A	S4DA	-	-
		S4S	S4DS	-	7 or 8
<u>Transformer Rated Types</u>					
General Electric	Bottom Con. Socket	V64A	VM64A	-	-
		V64S	VM64S	-	13
Landis & Gyr	Bottom Con. Socket	MT-9A	BMT-9A	-	12
		MT-9S or 10S	BMT-9S or 10S	-	13
Schlumberger	Bottom Con. Socket	S4A	S4DA	-	-
		S4S	S4DS	-	13

ga-6  
October 1990

ga - Meters, Min/Max Indicating

Ammeters Indicating

<u>Manufacturer</u>	<u>Type</u>	<u>Description</u>
Biddle	50,000 Series	Thermal, Max Pointer
ED Electric	Max-I-Meter (all models)	Thermal Ammeter
Schlumberger	ADS	Thermal Ammeter

Voltmeter, Min/Max

<u>Manufacturer</u>	<u>Type</u>	<u>Description</u>
Appalachian Electronic Instruments	LVM-100	Digital Min/Max averaging voltmeter
Demico	AV12	Digital min/max averaging voltmeter
Bitronics	290-2873-501	Digital Demand min/max voltmeter

gb - Meter Sockets

Manufacturer	Ring	Type or Catalog Number	No. Jaws	Rating, Amps.
Durham	R-7000 Series# R-71000 Series# R-81000 Series#	7000 Series#	4 or 5	100
		71000 Series#	4 or 5	200
		81000 Series#	4 or 5	200
Dyna-Tech	1100-C - 1107-C 1300-C - 1307-C 2100-CH-2107-CH 2300-CH-2307-CH	Overhead		
		1000-C - 1007-C	4 & 5	100
		1200-C - 1207-C	4 & 5	100
		2000-CH-2007-CH	4 & 5	200
		2200-CH-2207-CH	4 & 5	200
General Electric	R-2#	Underground		
		2590-CHU-2597-CHU	4 & 5	200
		2790-CHU-2797-CHU	4 & 5	200
		2090-CHU-2097-CHU	4 & 5	200
		2290-CHU-2297-CHU	4 & 5	200
		SI-73#	4, 5, 6	100
		SI-73# for	4, 5, 6	100
		Underground	4, 5, 6	200
		SV-60#	4, 5, 6	200
		SI-60#	4, 5, 6	200
General Switch	42100 Series*	SI-60	7, 8, 13	100-200, 20
			4, 5, 6	100
			5, 6	20
Landis & Gyr	AS Series	Overhead		
		AS Series	4, 5, 6	100-200
		A2 thru A6	4, 5	100-200
		Series (Multiple Mounting)		
		CQ#	4, 5, 7	200
		HQ#	4, 5, 7	200 HD
		HQ-T	6, 7, 8, 13	20
		Underground		
		RSU#	4, 5, 6	200
		CQ-U#	4, 5, 7	200
		HQ-U#	4, 5, 7	200

\*UL Label  
#Available with UL label

gb - Meter Sockets				
<u>Manufacturer</u>	<u>Ring</u>	<u>Type or Catalog Number</u>	<u>Ringless</u>	<u>No. Jaws</u>
Milbank				<u>Rating, Amps.</u>
		<u>Overhead</u>		
	S7486 Series,		S7462, 3,4,5,6	100
	S7262 Series,		U7362*, 3,4,5,6	100
	S7021 Series,		R7486 Series*	150
	S9550 Series,		U7262 Series*	200
	S9700 Series,		U7021 Series*	200 (HD)
			U9550 Series*	200 (HD)
			U9700 Series*	200 (HD)
		<u>Underground</u>		
	S8086-XL,		U8086-XL*	100
	S8084-XL,		U8084-XL*	150
	S7040-XL,		U7040-XL*	200
	S9551-XL,		U9551-XL*	200 (HD)
	S9701-XL,		U9701-XL*	200 (HD)

# Available with UL label

\*UL label

Conditional List  
gw(1)  
July 1990

gw - Crossarm Assembly for H-Frame Construction

Applicable Specification: REA Specification T-7

Applicable Drawing: Drawing TH-11B Series (161 kV maximum)

Condition: These adjustable spacers are not interchangeable with fixed spacers, and are only for use where the Borrower has determined that interchangeability with fixed spacers or standard adjustable spacers will not be required in the future.

	<u>Catalog Numbers or Drawing Numbers</u>			
	<u>TH-11B</u>	<u>TH-11BVO</u>	<u>TH-11BVI</u>	<u>TH-11BV4</u>
American Crossarm & Conduit	70250	7025V0	7025VI	7025V4

Conditional List  
gw(2)

gw - Crossarm Assembly for H-Frame Construction  
(Double Arm) 230 kV (Small Angle)

Applicable Specification: REA Specification T-8

Applicable Drawing: Drawing TH-231B

Condition: These adjustable spacers are not interchangeable with fixed spacers, and are only for use where the Borrower has determined that interchangeability with fixed spacers or standard adjustable spacers will not be required in the future.

	<u>Catalog Numbers or Drawing Numbers</u>
	<u>Crossarm 3-5/8" x 9-3/8"</u>
American Crossarm & Conduit	8026VB

gx-1  
October 1990

gx - Single Pole Steel Structures with Arms

Applicable Specification: REA Specification for Single Pole Steel  
Structures Complete with Arms, T-9

Manufacturer

FL Meyer Industries

Muskogee Iron Works

Power Enterprises, Inc.

Union Metal

Valmont Industries, Inc.

sb - Switch, disconnect (single-pole, hook operated station class)

NEMA standard switches for station or line  
structure use where single-pole switching is permissible

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Ratings</u>	<u>System Voltages Line to Line</u>
ABB	HPL	15 thru 69 kV	12.5 thru 69 kV
Bridges	EH	15 thru 69 kV	12.5 thru 69 kV
	EHL(L)	15 thru 34.5 kV	12.5 thru 34.5 kV
Cooper Power Systems (McGraw-Edison)	D2(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
G & W Electric	B-2M	15 thru 69 kV	12.5 thru 69 kV
	EV(PL)	15 thru 34.5 kV	12.5 thru 34.5 kV
Hi-Voltage (Joslyn)	HU	15 thru 34.5 kV	12.5 thru 34.5 kV
	HI	15 thru 34.5 kV	12.5 thru 34.5 kV
Johnson	HPT	15 thru 69 kV	12.5 thru 69 kV
Kearney	M-72(PL)	15 thru 69 kV	12.5 thru 69 kV
	H-72	15 thru 34.5 kV	12.5 thru 34.5 kV
MEMCO	STV	15 thru 69 kV	12.5 thru 69 kV
	STU	15 thru 69 kV	12.5 thru 69 kV
Morgan	DHS(PL)	15 thru 69 kV	12.5 thru 69 kV
Royal Switchgear	BT	15 thru 69 kV	12.5 thru 69 kV
	BLT(PL)	15 and 23 kV	12.5 thru 24.9 kV
S & C*	LBD(PL)	15 thru 34.5 kV	12.5 thru 34.5 kV
	Alduti (L)	15 and 25 kV	12.5 thru 24.9 kV
Seeco	BT	34.5 thru 69 kV	34.5 thru 69 kV
Siemens-Allis	HA	15 thru 69 kV	12.5 thru 69 kV
	HS(PL)	15 and 25 kV	12.5 thru 24.9 kV

(L) Means solid material load interrupters are available and accepted.

(LV) Means vacuum interrupters are available and accepted.

(PL) Means hooks for portable load interrupters are available for voltages 34.5 kV and below. Consult switch manufacturer concerning loop switching applications at higher voltages.

\*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

sb-2  
July 1990

sb - Switch, disconnect (single-pole, hook-operated station class)

NEMA standard switches for station or line  
structure use where single-pole switching is permissible

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Ratings</u>	<u>System Voltages Line-to-Line</u>
Southern States	PBO	15 thru 69 kV	12.5 thru 69 kV
	*PEN	15 thru 23 kV	12.5, 13.2, 24.9 kV
USCO	HH(PL)	15 thru 69 kV	12.5 thru 69 kV

(L) Means solid material load interrupters are available and accepted.

(LV) Means vacuum interrupters are available and accepted.

\* With steel base only.

(PL) Means hooks for portable load interrupters are available for voltages 34.5 kV and below. Consult switch manufacturer concerning loop switching applications at higher voltages.

sb - Switch, disconnect (single-pole, hook operated  
distribution class)\*

For distribution line use where power class insulation is not required and  
single-phase switching is permissible.

(Not suitable for substation use)

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Rating</u>	<u>System Voltage Line-to-Line</u>
Chance	M3(PL)	15 and 27 kV	12.5 thru 24.9 kV
Cooper Power Systems (McGraw-Edison)	D2(PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
G & W Electric Company	EV(PL)	15 kV	12.5 kV
Kearney	D-73(PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
Morgan	DHS(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
Royal Switchgear	BXT-F(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
S & C**	LBD(PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
Siemens-Allis	HD(PL)	15 and 25 kV	12.5 thru 24.9 kV

NOTE: Switches on this page must be furnished with four bolts for double  
crossarm mounting.

(L) Means solid material load interrupters are available and accepted.

(PL) Means hooks for portable load interrupters are available.

(LV) Means vacuum interrupters are available and accepted.

\*Steel bases only.

\*\*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic  
epoxy insulators through 34.5 kV on request.

Conditional List  
sb(1)  
July 1990

sb - Switch, hookstick  
(line tension switches)

for use on 12.5/7.2 kV systems only

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Bridges</u> 125	1279 (5/3/84)	To obtain experience.
<u>Chance</u> LTD06150-H	1279 (5/3/84)	To obtain experience.
<u>Royal Switchgear</u> IL6B-H	1332 (12/4/86) 1365 (6/23/88)	To obtain experience.

NOTE: All switches listed on this page have hooks for portable load  
interrupters.

sk  
October 1990

sk - Switch, regulator by-pass - disconnect  
For outdoor use

<u>Rating</u> <u>Manufacturer</u> <u>Amperes</u>	15 kV for use on	27 kV for use on	<u>Current</u>
	<u>12.5/7.2 kV Systems</u>	<u>24.9/14.4 kV Systems</u>	
Kearney	HB-65	HB-65	600
S & C Electric*	XL	XL	600
Siemens-Allis	HR	HR	600
Southern States	BR	BR	400,600

NOTE: All switches should be furnished with NEMA standard insulators and with 110 kV BIL rating (15 kV systems) or 150 BIL ratings (25 kV systems) for station use.

\*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

Conditional List  
sk  
July 1990

sk - Switch, regulator by-pass - disconnect  
For outdoor use

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Cooper Power Systems</u> (McGraw-Edison) Type B, 15 kV, 400 amperes 110 kV BIL for station use 95 kV BIL for line use.	1035 (2/21/74)	To obtain experience

NOTE: All switches should be furnished with NEMA standard insulators and  
with 110 kV BIL rating for station use.

s1  
October 1990

s1 - Switch, Combination Power Fuse and Disconnect

(Used with an additional disconnect switch to by-pass  
oil circuit reclosers at substations.)

<u>Manufacturer</u>	<u>15 kV for use on 12.5/7.2 kV systems</u>	<u>27 kV for use on 24.9/14.4 kV systems</u>
Hi Voltage	RFH	
Kearney	MHX	MHX
S & C Electric*	SMD/LBD XS/LBD	SMD/LBD
Southern States	SF	

NOTE: All switches and cutouts should be furnished with NEMA standard insulators.

\*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

Conditional List  
sr  
July 1990

sr - Steel for Substation Grounding, Copper-Clad or Galvanized

(See av-2 for copper grounding conductor)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Bethlehem Steel</u> 7/16" and 1/2" steel strand, BB grade, Class C galvanized	1015 (4/26/73)	1. To obtain experience  2. When used in soil with resistivity of 25 ohm- meters (2500 ohms per centimeter cube) or less, cathodic protection must be incorporated into the grounding design.
<u>Copperweld Steel</u> 40% conductivity DSA Copperweld Strand in sizes: 1/2" (7 No. 6 AWG) 9/16" (7 No. 5 AWG) 5/8" (7 No. 4 AWG) 13/16" (19 No. 6 AWG) 7/8" (19 No. 5 AWG)	954 (10/29/70)	1. To obtain experience  2. When used in soil with resistivity of 25 ohm- meters (2500 ohms per centimeter cube) or less cathodic protection must be incorporated into the grounding design.
<u>Indiana Steel &amp; Wire</u> Steel Strand, BB Grade, Class C galvanized 5/8" (19 wire) 1/2" (7 wire) 9/16" (7 wire) 7/16" (7 wire)	1004 (11/16/72)  1133 (2/16/78)	1. To obtain experience  2. When used in soil with resistivity of 25 ohm- meters (2500 ohms per centimeter cube) or less cathodic protection must be incorporated into the grounding design.

## PART II

### Underground Distribution Equipment

The realm of underground distribution has made quite significant advances in the past few years. Due to these advances and the increasing feasibility of underground rural distribution, most REA borrowers have placed some distribution equipment underground, are presently planning to, or are anticipating doing so in the future. If borrowers are to obtain reliable and economical underground systems, approved standards for construction and equipment must be observed.

Underground equipment considered suitable is being included in the "List of Materials Acceptable for Use on Systems of REA Electrification Borrowers." Specifications have been written and are available on much of this equipment. It must be realized that very little operating experience is available on this type equipment. Therefore, much of the underground equipment will be listed as "Conditional" until such experience is obtained that will warrant removing the "Conditional" listing. Listing of an item as "Conditional" does not mean that the item is inferior. Conditional means that service experience is desired so the item can be properly evaluated and demonstrate satisfactory performance before consideration for final acceptance.

Any comments or suggestions regarding the use or operation of the listed underground equipment will be welcome.

U ae  
October 1990

U ae - Surge Arresters, Distribution  
for Underground System Pole Risers  
(Lightning Arresters)

<u>Manufacturer</u>	<u>Arrester Class</u>	<u>Arrester Type</u>	<u>Ratings - kV</u>
ABB	Distribution, normal duty	GLV	9, 10
	Distribution, normal duty	LVBB	18
Cooper Power Systems (McGraw-Edison)	Distribution, normal duty	ES	9/10, 18
	Distribution, heavy duty	EL	9, 10, 18
General Electric	Distribution, heavy duty	Alugard	9, 10, 18
Joslyn	Distribution, normal duty	Q	9/10, 18
	Distribution, heavy duty	J	9/10, 18
Kearney	Distribution, heavy duty	Unigap	9, 10, 18

\*Has intermediate class arrester characteristics but does not have intermediate class venting capability.

NOTE: The arresters listed on this page may be used singly or in parallel, but must be applied in accordance with paragraph VI.A., in REA Bulletin 61-3, "Underground Rural Distribution." Other arresters listed on pages ae-1 and ae-2 may be used for underground systems when applied in accordance with this bulletin.

## U ae - Arresters, Surge

(For Underground System Pole Risers)

Ohio Brass

Metal oxide type	1236	To obtain experience.
DynaVar 9, 10, 18kV	6/10/82	
Porcelain, VR	1378	
Polymer, Non-Fragmenting	2/9/89	
Design, PVR	1396	
	1/11/90	
Metal Oxide, DynaVar	1236	To obtain experience.
Intermediate Class	6/10/82	
9, 10, 18 kV		

U an-1.1  
October 1990

U an - Transformers, distribution  
pad-mounted, dead-front

(For underground application)

Applicable Specifications: "REA Specifications for Pad-Mounted  
Transformers," U-5.

<u>Manufacturer</u>	<u>Single Phase</u>	<u>Three-Phase</u>
Central Moloney (2, 4)	"REA-LP" 25-167 kVA	
Cooper (2, 4)	"REA Shrubline" 15-167 kVA	"REA Terra-Tran" 45-2500 kVA
ERMCO (2, 4)	"Low-Profile" 10-167 kVA	
General Electric (2, 4)	"Mini-Pad III - REA" 10-167 kVA	"Compad IV - REA" 75-2500 kVA
Hevi-Duty/Dowzer (3, 4)	"METRI-PAD" 25-167	"PM3W-R" 75-500 KVA
Howard (2, 4)	"Hi Pad REA" 10-167 kVA	"Hi Pad 3 REA" 45-2500 kVA
Kuhlman (2, 4)	"Lo-Pak ELR" 25-167 kVA	"K-PAK-3 REA" 750-2500 KVA
NECO/Hammond (2)	HMM-R, 10-50 kVA SP-R, 75-167 kVA	TP-R, 45-1000 kVA
Pauwels-Chance(2,4)	"Turf-Hugger-R" 10-100 KVA	"Turf-hugger-R" 45-500 KVA
H. K. Porter (2, 4) (Delta-Star)	"Low Profile U 5-R" 25-167 kVA	"Porter U5-R3" 225-2500 kVA
United (Ky, AEC)(2, 4)	"Pad-Mount" 15-75 kVA	

- (1) 7.2/12.5 and 7.6/13.2 kV
- (2) 7.2/12.5, 7.6/13.2 and 14.4/24.9 kV
- (3) 7.2/12.5 and 7.6/13.2 kV (conditional listing for 14.4/24.9 kV)
- (4) Dual Voltage - Same as for 14.4/24.9 kV, single phase
- (5) Three-phase listing applies to 7.2/12.5 and 7.6/13.2 kV only
- (6) 14.4/24.9 kV

Conditional List  
U be  
July 1990

U be - Reclosers, pad-mounted

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>*Cooper Power Systems</u> (McGraw-Edison)	1373	To obtain experience.
Single phase, vacuum interrupter, Type PV4H Maximum voltage 14.4 kV for 12.5 and 13.2/7.62 kV	11/17/88	
*Ratings greater than 100 amp. for 12.5/7.2 kV application, and greater than 200 amp. for 24.9/14.4 kV application are acceptable only with ground trip devices.		

U cg  
October 1990

U cg - Switch, air, three-pole, group-operated  
for pole-mounted cable risers  
(Factory Preassembled)

<u>Manufacturer</u>	<u>Mounting</u>	<u>Vertical Break Type          kV</u>	<u>Side Break Type          kV</u>
ABB	Vertical	LB3-VR(L)15	
Chance	Vertical		D7(L)15-27
	Horizontal		D7(L)15-27
S & C*	Vertical		Alduti(L)15-25
	Horizontal		Alduti(L)15-25

(L) Means gas or solid material full-load interrupters are accepted and available.

NOTE: Switches with factory-assembled crossarm type bases must have nonconducting crossarm type bases, nonconducting braces, and insulated interphase and control rods.

\*Available with porcelain insulators. Available with "Cypoxy" cycloaliphatic epoxy insulators through 34.5 kV on request.

U gn - Enclosures, Equipment

Manufacturer

Catalog No.

Cooper Power Systems (RTE)

SectER Series 400L (1ø)

SectER Series 450L (3ø)

Highline

HL80P-15 (15 kV)

HL81P-15 (15 kV)

HL90P (15 kV)

Sectionalizing Enclosures

Ranger

TE-501, TE-503

U go  
October 1990

U go - Fault Indicator  
(For Construction Unit UM6-4)

Manufacturer

Type

Cooper Power Systems  
(McGraw-Edison, RTE)

Linam TPR, LV, MR

Edison Control Corporation

Series EC100 (single phase)  
Series EC300 (three phase)  
(Available with mounting kit  
KT5002)

Fisher Pierce

Series 1514  
(To be used on single-phase  
circuits only)

U he - Enclosures, Sectionalizing Equipment

12.5/7.2 kV

Manufacturer

Catalog Number

ABB

UTE, PAD-PAK pad-mounted switching device,  
single and three-phase, 300 amp

Cooper Power Systems  
(McGraw-Edison)

EH3A Series, single-phase, pad-mounted

Durham

AFSP Series, single-and three phase

Electrical Equipment

FTDF-P Series, single and three-phase  
one and two fused taps, pad-mounted

Elliott

Type EPFR, single and three-phase,  
pad-mounted

Malton

\*ME Fused Series, single and three-phase  
pad mounted.

S & C

Mark III, Models PMS (with option G-7)  
200 ampere three-pole switching and  
200 ampere single-pole switching

\*Furnished with current limiting fuses.

NOTE 1: Enclosures on this page must comply with the dead-front requirements of REA Spec. U-4.

NOTE 2: Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

U he-2  
October 1990

U he - Enclosures, Sectionalizing Equipment

24.9/14.4 kV

Manufacturer

Catalog Number

ABB

UTE, PAD-PAK pad-mounted switching device, single and three-phase, 200 amp

Cooper Power Systems (RTE)

Type LBS, single- and three-phase, pad-mounted 300 amp  
FuseTER Series, single-phase and three-phase

Durham

AFSP Series, single-and three phase

Elliott

Type EPMR, single- and three-phase, pad-mounted

Malton

ME Fused Series, single and three phase, pad-mounted

NOTE 1: Enclosures on this page must comply with the dead-front requirements of REA Specification U-4.

NOTE 2: Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

U he - Enclosures, Sectionalizing Equipment

(200 and 600 amp)

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Chance</u>	Type LVS (submersible and pad-mounted) single-phase and three-phase, vacuum switching equipment, fused or unfused, 200 or 600 amp, 15-25 kV
<u>Cooper Power Systems (RTE)</u>	Type LBS, single- and three-phase, pad-mounted 15 kV Type R-VAC, three-phase vacuum switchgear, 15-25 kV
<u>Electrical Equipment</u>	Type PSI-PSI/II Series, 15 kV, 25 kV, 600 amp., three-phase switching, and 200 amp., single-phase switching. (When ordering, add suffix B-4)
<u>Elliott</u>	Type EPMR, Single and three-phase, pad-mounted, 25 kV
<u>Kearney</u>	Series VP - submersible, single-phase and three-phase, vacuum switching, 200 or 600 amp, 15 and 25 kV, with or without VACOP remote operator
<u>Joslyn</u>	Types PG6, PFG6, LPG6, LPFG6, SG6, SFG6 (submersible and pad-mounted, fused or unfused) single and three-phase switching equipment, 200 and 600 amp, 15 or 25 kV
<u>Malton</u>	MES 100 Series, pad-mounted single phase and three phase switching

Note 1: Enclosures on this page must comply with the deadfront requirements of REA Spec. U-4.

Note 2: Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

U he-3.1  
October 1990

U he - Enclosures, Sectionalizing Equipment

(200 and 600 amp.)

Manufacturer

Catalog Number

Cooper Power Systems

Type VFI, single-phase and three phase,  
padmounted fault interrupters, 15-35 kV

S & C

Mark III, Model PMH (with option G-7),  
15-25 kV, 600 amp., three-phase  
switching and 200 amp., single-pole  
switching  
Model PME-15-25 kV, Fully enclosed live  
parts at all times, three-phase  
switching and 200 amp single pole  
switching

Trayer

800 Series, pad mounted three-phase vacuum  
switching equipment, 200 and 600 amp.,  
15-25 kV with or without fusing  
501 submersible vacuum fuse enclosure,  
deadfront 200 or 600 amp., 15-25 kV  
Type SSA (submersible, fused and unfused)  
200 and 600 amp., 15-25 kV

Note 1: Enclosures on this page must comply with the deadfront requirements  
of REA Spec. U-4.

Note 2: Single-pole switching of three-phase underground circuits may cause  
ferroresonance. Refer to REA Bulletin 61-3.

U hv - Cable, Underground  
15 kV Cable

Applicable Specification: REA Specification U-1  
Conductor: Copper or Aluminum - #2 AWG through 1000 kcmil  
Insulation: Crosslinked Polyethylene (XLP)  
(a) indicates Union Carbide 4201 XLP  
(b) indicates BP 521 XLP-TR  
Tree-retardant Crosslinked Polyethylene (XLP-TR)  
(1) indicates Union Carbide 4202 XLP-TR  
(2) indicates BP H119Y XLP-TR  
(3) indicates BP H118Y XLP-TR  
Ethylene Propylene Rubber (EPR)  
Neutral: Copper Concentric Neutral  
Jacket: High Molecular Weight Polyethylene

<u>Manufacturer</u>	<u>Insulation(s)</u>	<u>Flat Strap Neutral Available</u>
Cablec	XLP (a,b), XLP-TR (1,3) EPR	Yes
CPI	XLP (a), XLP-TR (1), EPR	Yes
Hendrix	XLP (a), XLP-TR (1, 2, 3,) EPR	No
Kerite	EPR	Yes
Okonite	XLP (a), XLP-TR (1), EPR	Yes
Pirelli	XLP (a), XLP-TR (1), EPR	Yes
Reynolds	XLP (a), XLP-TR (1), EPR	Yes
Rome	XLP (a), XLP-TR (1), EPR	Yes
Southwire Furakawa	XLP (a), XLP-TR (1)	No

\*For grounding purposes insulated jacketed cables must be treated like overhead lines, i.e., at least four ground rods must be installed per mile in accordance with the NESC. (This does not include service grounds, etc., but does include equipment grounds.) Additional grounding may be necessary in soils with higher resistivity. In splices or tap connections, a good seal should be achieved to exclude moisture.

U hv-2  
July 1990

U hv - Cable, Underground  
25 kV Cable

Applicable Specification: REA Specification U-1  
Conductor: Copper or Aluminum - #1 AWG through 1000 kcmil  
Insulation: Crosslinked Polyethylene (XLP)  
(a) indicates Union Carbide 4201 XLP  
(b) indicates BP 521 XLP-TR  
Tree-retardant Crosslinked Polyethylene (XLP-TR)  
(1) indicates Union Carbide 4202 XLP-TR  
(2) indicates BP H119Y XLP-TR  
(3) indicates BP H118Y XLP-TR  
Ethylene Propylene Rubber (EPR)

Neutral: Copper Concentric Neutral  
Jacket: High Molecular Weight Polyethylene

<u>Manufacturer</u>	<u>Insulation(s)</u>	<u>Flat Strap Neutral Available</u>
Cablec	XLP (a,b), XLP-TR (1,3) EPR	Yes
CPI	XLP (a), XLP-TR (1), EPR	Yes
Hendrix	XLP(a), XLP-TR (1,2,3) EPR	No
Kerite	EPR	Yes
Okonite	XLP (a), XLP-TR (1), EPR	Yes
Pirelli	XLP (a), XLP-TR (1), EPR	Yes
Reynolds	XLP (a), XLP-TR (1), EPR	Yes
Rome	XLP (a), XLP-TR (1), EPR	Yes
Southwire Furakawa	XLP (a), XLP-TR (1)	No

\*For grounding purposes insulated jacketed cables must be treated like overhead lines, i.e., at least four ground rods must be installed per mile in accordance with the NESC. (This does not include service grounds, etc., but does include equipment grounds.) Additional grounding may be necessary in soils with higher resistivity. In splices or tap connections, a good seal should be achieved to exclude moisture. It is recommended that any place that the jacketing is cut (including the connections to ground rods), it be done above ground in a pedestal.

U hv - Cable, Underground

600 Volt Cable

Applicable Specification: REA Specification U-2  
Conductor : Copper, #4 AWG and larger  
Aluminum, #2 AWG and larger  
Insulation : Cross-Linked polyethylene (XLPE)

<u>Manufacturer</u>	<u>Type Conductor</u>
Alcan	Copper or Aluminum
Aluserve	Copper or Aluminum
Cablec	Copper or Aluminum
Collyer	Copper or Aluminum
Conductor Products	Aluminum
Essex	Copper or Aluminum
General Electric	Copper or Aluminum
Kaiser	Aluminum
Okonite	Copper or Aluminum
Phelps Dodge	Copper or Aluminum
Phillips Cables, Inc. (Marked "Phillips W")	Copper or Aluminum
Pirelli	Copper or Aluminum
Reynolds	Copper or Aluminum
Rome Cable	Copper or Aluminum
Southwire	Copper or Aluminum

NOTE: The manufacturers shown above have indicated that their 600 volt cable is suitable for use on 480 volt corner grounded delta circuits.

The above cable may be supplied with UL label for Type USE.

U hv-4  
October 1990

U hv - Cable, Underground

600 Volt Multi-Conductor Cable

Applicable Specification: REA Specification U-2  
Conductor : Copper, #4 AWG and larger  
Aluminum, #2 AWG and larger  
Insulation : Cross-Linked polyethylene (XLPE)  
Cable Configuration : 3 Insulated Conductors Triplexed

<u>Manufacturer</u>	<u>Type Conductor</u>
Alcan	Copper or Aluminum
Aluserve	Copper or Aluminum
Cablec	Copper or Aluminum
Conductor Products	Aluminum
Essex	Copper or Aluminum
General Electric	Copper or Aluminum
Kaiser	Aluminum
Okonite	Copper or Aluminum
Phillips Cables, Inc. (Marked "Phillips W")	Copper or Aluminum
Pirelli	Copper or Aluminum
Reynolds	Copper or Aluminum
Rome Cable	Copper or Aluminum
Southwire	Copper or Aluminum

The above cable may be supplied with UL label for Type USE.



